We claim:

1. A method of forming an energy converter for converting vibrational energy of the vibrationally energized species into useful form of energy, comprising:

forming a conducting surface on a stabilizing interlayer conductor, the conducting surface being formed from one or more nanostructures in contact with a region having at least some vibrationally energized species;

forming the stabilizing interlayer conductor on an ohmic contact conductor, the stabilizing interlayer conductor being formed from one or more nanostructures;

forming the ohmic contact conductor on a tailoring conductor, the ohmic contact conductor being formed from one or more nanostructures;

forming the tailoring conductor on a semiconductor, the tailoring conductor being formed from one or more nanostructures; and

forming the semiconductor into a pn junction.

2. The method of claim 1, further including:

choosing the tailoring conductor material from those materials having a surface energy that approximately matches the surface energy of the semiconductor.

3. The method of claim 1, further including:

limiting total thickness of the conductors and the nanostructures to a thickness sufficiently small to render the total thickness to be relatively transparent relative to the ballistic transport of hot electrons through the conductors and the nanostructures.

4. The method of claim 1, wherein the total dimension of all the layers ranges from sub-monolayer to 200 monolayers.

5. The method of claim 1, wherein vibrationally energized species generated on or near the conducting surface transfer a fraction of its vibrational energy to ballistic electrons in the conducting surface when the vibrationally energized species contacts the conducting surface.

6. The method of claim 5, wherein kinetic energy of ballistic electrons are converted into a useful diode forward bias voltage in the semiconductor formed into the pn junction.

7. The method of claim 1, wherein the one or more nanostructures include nanolayer, nanocluster, quantum well, or combinations thereof.

8. A method of forming an energy converter for converting vibrational energy of the vibrationally energized species into useful form of energy, comprising:

forming a conducting surface on a stabilizing interlayer conductor, the conducting surface being formed from one or more nanostructures in contact with a region having at least some vibrationally energized species;

forming the stabilizing interlayer conductor on a Schottky conductor, the stabilizing interlayer conductor being formed from one or more nanostructures;

forming the Schottky conductor on a tailoring conductor, the Schottky conductor being formed from one or more nanostructures;

forming the tailoring conductor on a semiconductor, the tailoring conductor being formed from one or more nanostructures.

9. The method of claim 8, further including:

choosing the stabilizing interlayer conductor from materials that block the passage of reactants and reaction products from reacting with or diffusing through the Schottky conductor.

10. A method of forming an energy converter for converting vibrational energy of the vibrationally energized species into useful form of energy, comprising:

forming a conducting surface from one or more conductors and conducting catalysts on a stabilizing interlayer conductor;

forming the stabilizing interlayer conductor on a conductor material;

forming the conductor material on a tailoring conductor; and

forming the tailoring conductor on a semiconductor.

11. The method of claim 10, wherein the stabilizing interlayer conductor comprises at least gold.

12. The method of claim 10, wherein the forming the conductor material includes forming an ohmic contact conductor on a tailoring conductor.

13. The method of claim 12, wherein the ohmic contact conductor has a thickness of 50 nanometers or less.

14. The method of claim 10, forming the tailoring conductor includes forming the tailoring conductor in contact with the semiconductor.

15. The method of claim 10, wherein the tailoring conductor comprises at least chrome.

16. The method of claim 10, further including limiting the thickness of the conducting catalysts to under 20 nanometers.

17. The method of claim 10, further including limiting the thickness of the stabilizing interlayer conductor to under 50 nanometers.

18. The method of claim 10, further including limiting the thickness of the tailoring conductor to 4 monolayers or less.

19. The method of claim 10, further including forming the semiconductor with a band gap energy less than a probable energy of ballistic electrons generated in the energy converter.

20. The method of claim 10, wherein the one or more conducting catalysts include one or more of platinum, palladium, ruthenium, ruthenium oxides, vanadium, vanadium oxides, transition metals or combinations thereof.

21. The method of claim 10, wherein the forming the conductor material includes forming a Schottky conductor.

22. The method of claim 21, wherein the Schottky conductor is formed from gold, silver, platinum, palladium, ruthenium and its oxides, vanadium and its oxides, transition metals, or combinations thereof.

23. The method of claim 21, further including limiting the thickness of the Schottky conductor to 10 nanometers or less.

24. The method of claim 10, wherein the semiconductor is formed from TiO_2, a wide bandgap semiconductor, or combinations thereof.

25. An energy converter, comprising:

a stabilizing interlayer conductor formed on a conductor material;

a conducting surface formed on the stabilizing interlayer conductor, the conducting surface formed from one or more nanostructures in contact with or near a region for containing vibrationally energized species;

a tailoring material on which the conductor material is formed; and

a semiconductor on which the tailoring material is formed.

26. The energy converter of claim 25, wherein at least the conducting surface, the stabilizing interlayer conductor, the tailoring material, or the semiconductor is formed as one or more nanostructures.

27. The energy converter of claim 25, wherein the conductor material includes a Schottky conductor.

28. The energy converter of claim 25, wherein the conductor material includes an ohmic contact material.

29. The energy converter of claim 25, wherein the semiconductor includes p-type and n-type semiconductor forming a pn junction.

30. The energy converter of claim 25, further including a substrate on which the semiconductor is formed.

31. The energy converter of claim 30, wherein the substrate includes at least a heat conducting substrate.

32. The method of claim 8, further including:

limiting total thickness of the conductors and the nanostructures to a thickness sufficiently small to render the total thickness to be relatively transparent relative to the ballistic transport of hot electrons through the conductors and the nanostructures.

33. The method of claim 8, wherein the total dimension of all the layers ranges from sub-monolayer to 200 monolayers.

34. The method of claim 8, wherein vibrationally energized species generated on or near the conducting surface transfer a fraction of its vibrational energy to ballistic electrons in the conducting surface when the vibrationally energized species contacts the conducting surface.

35. The method of claim 1, further including:

choosing the stabilizing interlayer conductor from materials that block the passage of reactants and reaction products from reacting with or diffusing through a Schottky conductor.

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